What is claimed is:

1.   A method for analysis of physiological or health data in at least two levels of detail, said method comprising:

     analyzing a plurality of primary elements in said data in first scale, low level resolution to detect one-time changes in such primary elements and thereby identify abnormal or unstable primary elements;

     comparing said primary elements with reference values for such primary elements, and representing deviation of primary elements from the reference values in a form understandable to a lay person;

     analyzing at least some of the same said primary elements in said data in a second scale, higher level resolution using at least one of the following methods selected from mathematical decomposition, methods of artificial intelligence, and a combination of mathematical decomposition with methods or artificial intelligence to provide detailed characterization of serial changes in said abnormal or unstable primary elements; and

     exchanging information between said analyzing in said first and second levels of resolution to improve at least one of said first and second analyses.

2.   A method as set forth in claim 1 in which said analyzing a plurality of primary elements in said data in first-scale low resolution is selected from a mathematical decomposition and methods of artificial intelligence.

3.   A method as set forth in claim 1 in which analyzing said data to provide detailed characterization of serial changes in said abnormal or unstable primary elements is performed using at least one of the following methods selected from non-orthogonal decomposition (independent component analysis), multidimensional scaling based on non-metric distances and mapping techniques, non-orthogonal linear mappings, nonlinear mappings and other methods, that make use of projection, re-scaling (change of variables), methods from the theories of singularities, bifurcations, catastrophes, and dynamical systems, and other statistical estimators, such as a linear and nonlinear correlation, analysis of variance, cluster analysis, factor analysis, canonical analysis, regression and discriminant function

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analyses, and probabilistic methods, such as Bayesian probability and Mahalanobis distance, pattern recognition, fuzzy logic, neural networks, expert systems, and hybrid artificial intelligence systems.

4.   A method as set forth in claim 1 in which analyzing said data to provide detailed characterization of serial changes in said abnormal or unstable primary elements is selected from a fuzzy-logic classifier and a dynamic neural network with at least one neuron (unit) analyzing changes in at least one state of activity of at least one physiological, biochemical, biophysical, mechanical, and genetic system relative to at least one reference value.

5.   A method as set forth in claim 1 in which said reference values are represented by a relation (function, distribution) between said reference values and at least one state of at least one physiological, biochemical, biophysical, mechanical, and genetic system.

6.   A method as set forth in claim 1, in which said analysis and representation are applied to physiological signals such as blood pressure, cardiac output, vascular activity, temperature, respiration, cardiac, abdominal, or breathing sounds, blood flow, hormonal concentration, enzyme and protein level, genetic, proteomic, and molecular data, neural activity, electroencephalographic activity, and other electrical, mechanic, sonic, biochemical, biophysical processes in the human body, demographic, psychological, and environmental data.

7.   A system for detection of serial changes in physiological or health data and analysis in at least two levels of detail for use by both lay persons and medical professionals, said system comprising:

multiple acquisition units connected to a network for collecting physiological or health data from a subject over a period of at least several seconds;

at least one first analysis and processing unit for detecting a plurality of primary elements from said data and processing said primary elements in low level resolution to generate data respecting time intervals or amplitudes of said primary elements, storing reference values of said plurality of primary elements, and comparing said reference values with data newly received by said first analysis and

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processing unit and producing qualitative indicators and quantitative data of differences between said recorded data and said newly received data;

an output unit for displaying said qualitative indicators in a form understandable by lay persons and quantitative data for medical professionals; and

a communications unit for sending quantitative data of said primary elements to a network of computers for processing and detailed analysis of serial changes in at least some of the said primary elements in said data, said network of computers for a higher resolution analysis using at least one of the methods selected from mathematical decomposition and methods of artificial intelligence for assessing small changes in serial data and for exchanging information with said first analysis and processing unit to improve at least one of said low-level and higher-level resolution.

8. A detection and analysis system as set forth in claim 7 which includes multiple first analysis and processing units connected to a network.

9. A detection and analysis system as set forth in claim 7 in which said first analysis unit and said network of computers analyze said data to provide detailed characterization of serial changes in said abnormal or unstable primary elements using at least one of the following methods selected from non-orthogonal decomposition (independent component analysis), multidimensional scaling based on non-metric distances and mapping techniques, non-orthogonal linear mappings, nonlinear mappings and other methods, that make use of projection, re-scaling (change of variables), methods from the theories of singularities, bifurcations, catastrophes, and dynamical systems, and other statistical estimators, such as a linear and nonlinear correlation, analysis of variance, cluster analysis, factor analysis, canonical analysis, regression and discriminant function analyses, and probabilistic methods such as Bayesian probability and Mahalanobis distance, pattern recognition, fuzzy logic, neural networks, expert systems, and hybrid artificial intelligence systems.

10. A detection and analysis system as set forth in claim 7 in which said first analysis unit and said network of computers analyze other physiological data such as blood pressure, cardiac output, vascular activity, temperature, respiration, cardiac, abdominal, or breathing sounds, blood flow, hormonal concentration, enzyme and protein level, genetic, proteomic, and molecular data, neural activity, electroencephalographic activity, and other electrical, mechanic, sonic, biochemical, biophysical processes in the human body, demographic, psychological, and environmental data.

11. A detection and analysis system as set forth in claim 7 in which said communication unit is wireless.

12. A system as set forth in claim 7 in which said higher-level analysis is distributed among several computers connected via computer networks.

13. A system as set forth in claim 7 in which said data acquisition and low-level analysis of health data are distributed among several personal devices, selected from noninvasive and implantable devices, which are connected via computer networks.

14. A system as set forth in claim 7 in which said higher-level analysis of health data is performed using parallel processing.

15. A system as set forth in claim 7 in which said higher-level analysis of health data is distributed among several computers connected via specialized computer networks, including networks for home use, work environment, hospital, and transportation.

16. A system as set forth in claim 7 in which said higher-level analysis of health data is distributed among several computers connected via specialized computer networks, including networks for tracking serial changes in patients with congestive heart failure, coronary artery or ischemic heart disease, cardiac arrhythmias, hypertension, syncope, asthma, diabetes, and other illnesses.

17. A system as set forth in claim 7 in which said higher-level analysis of health data is integrated into an artificial intelligence system, which may include an expert system, a neural network or a combination of the methods (a hybrid system).

18. A system as set forth in claim 7 in which said network of computers includes at least one of a fuzzy-logic classifier and a dynamic neural network with at least one neuron (unit) for analyzing changes in at least one state of activity of at least one physiological, biological, biophysical, mechanical and genetic system relative to at least one reference value.

19. A system as set forth in claim 7 in which said reference values are represented by a relation (function, distribution) between said reference values and at least one state of at least one physiological, biochemical, biophysical, mechanical, and genetic system.

20. A portable system for monitoring physiological or health data and analyzing the data in at least two levels of detail (or resolution) for displaying changes detected in the data, said portable system comprising:

at least one acquisition unit for receiving physiological or health data generated by monitoring a subject for at least several seconds;

at least one analysis unit for detecting a plurality of primary elements from said signals to detect one-time changes in such primary elements and thereby identify abnormal or unstable primary elements, storing said plurality of primary elements, comparing said plurality of primary elements which have been stored with a plurality of primary elements newly received from said analysis nodule and producing both qualitative and quantitative information representing the differences in the data in low level resolution, and using at least one of the following methods selected from mathematical decomposition and methods of artificial intelligence to provide detailed characterization of serial changes in said abnormal or unstable primary elements in higher level resolution;

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an output unit for displaying qualitative information understandable by lay persons and quantitative information useful to medical professionals; and

a communications unit for sending data to a network of connected computer devices for processing, analyzing, and exchanging information between said at least one analysis unit and said network of computer devices to improve functionality of at least one of said one analysis unit.

21. A portable system as set forth in claim 20 which includes multiple acquisition units connected to a network and multiple analysis units connected to a network.

22. A portable system as set forth in claim 20 that further includes an analysis unit for analyzing said primary elements in third level high resolution using at least one of the methods selected from mathematical decomposition and methods of artificial intelligence.

23. A portable system as set forth in claim 20 in which said at least one analysis unit and said network of computers analyze said data in low and higher resolution respectively to provide detailed characterization of serial changes in said abnormal or unstable primary elements using at least one of the following methods selected from non-orthogonal decomposition or independent component analysis, multidimensional scaling based on non-metric distances and mapping techniques, non-orthogonal linear mappings, nonlinear mappings and other methods, that make use of projection, re-scaling (change of variables), methods from the theories of singularities, bifurcations, catastrophes, and dynamical systems, and other statistical estimators, such as a linear and nonlinear correlation, analysis of variance, cluster analysis, factor analysis, canonical analysis, regression and discriminant function analyses, and probabilistic methods such as Bayesian probability and Mahalanobis distance, pattern recognition, fuzzy logic, neural networks, expert systems, and hybrid artificial intelligence systems.

24. A portable system as set forth in claim 20 in which said at least one analysis unit and said network of computers analyze other physiological data such

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as blood pressure, cardiac output, vascular activity, temperature, respiration, cardiac, abdominal, or breathing sounds, blood flow, hormonal concentration, enzyme and protein level, genetic, proteomic, and molecular data, neural activity, electroencephalographic activity, and other electrical, mechanic, sonic, biochemical, biophysical processes in the human body, demographic, psychological, and environmental data.

25. A system as set forth in claim 20 in which said network of computers includes at least one of a fuzzy-logic classifier and a dynamic neural network with at least one neuron (unit) for analyzing changes in at least one state of activity of at least one physiological, biological, biophysical, mechanical and genetic system relative to at least one reference value.

26. A system as set forth in claim 20 in which said reference values are represented by a relation (function, distribution) between said reference values and at least one state of at least one physiological, biochemical, biophysical, mechanical, and genetic system.

27. A system for detection of serial changes in health data and analysis of the data, said system comprising:

an implantable acquisition unit;

at least one external unit selected from a personal computer, a specialized processor, a personal digital assistant, and a computer organizer for collecting health data from a subject; said an external processing unit having wireless communication with said implantable acquisition unit;

wherein at least one of said implantable acquisition unit and said external device having the capability of detecting a plurality of primary elements from said data and processing said primary elements to generate reference vales respecting said primary elements, storing said reference values, comparing said reference values with data newly received by said implantable acquisition unit using at least one of the following methods selected from methods of artificial intelligence and mathematical decomposition to generate health data of differences between said reference data and said newly received data.

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28.   A system for detection of serial changes in health data and analysis of the data as set forth in claim 27, in which an implantable acquisition unit includes processing capability.

29.   A system as set forth in claim 27 in which said methods of non-orthogonal decomposition or independent component analysis, multidimensional scaling based on non-metric distances and mapping techniques, non-orthogonal linear mappings, non-linear mappings and other methods, that make use of projection, re-scaling (change of variables), methods from the theories of singularities, bifurcations, catastrophes, and dynamical systems, and other statistical estimators, such as a linear and nonlinear correlation, analysis of variance, cluster analysis, factor analysis, canonical analysis, regression and discriminant function analyses, and probabilistic methods, such as Bayesian probability and Mahalanobis distance, pattern recognition, fuzzy logic, neural networks, expert systems, and hybrid artificial intelligence systems.

30.   An external processing unit as set forth in claim 27 in which said communication between said at least two units is wireless.

31.   A system as set forth in claim 27 in which said health data may include blood pressure, cardiac output, vascular activity, temperature, respiration, cardiac, abdominal, or breathing sounds, blood flow, hormonal concentration, enzyme and protein level, genetic, proteomic, and molecular data, neural activity, electroencephalographic activity, and other electrical, mechanic, sonic, biochemical, biophysical processes in the human body, demographic, psychological and environmental data.

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